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10/510,353	06/23/2005	Klaus Hoffesommer	H 2293US	8385

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CASELLA & HESPOS
274 MADISON AVENUE
NEW YORK, NY 10016

EXAMINER	
TRAN, THUAN Q	
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3693	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/510,353	HOFFESOMMER, KLAUS	
	Examiner	Art Unit	
	Thuan Tran	3693	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,8-15,19,20,22-68 and 73-80* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,8-15,19,20,22-68 and 73-80* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 October 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6-23-2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. This action is in reply to the US application filed on 10-5-2004 and response to restriction requirement filed 11-14-2008.

2. Claims 1, 8-15, 19, 20, 22-68 and 73-80 are currently pending and have been examined.

Priority

3. Applicant's claim for the benefit of a prior-filed provisional application 60/370,608 on 4-5-2002 is acknowledged.

Information Disclosure Statement

4. The Information Disclosure Statement filed on 6-23-2005 has been considered. An initialed copy of the Form 1449 is enclosed herewith.

Election/Restrictions

5. Applicant's election with traverse of restriction in the reply filed on 11-14-2008 is acknowledged. The traversal is on the ground(s) that claim 1 is generic to all disclosed embodiments and all other claims pending in this application. This is found persuasive.

The requirement is deemed improper and is therefore rescinded. All currently pending claims are examined.

Claim Objections

6. Claims 75 and 76 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

7. Claim 75 is a computer program product for performing the method of claim 19, concerning balancing a number of loans with a number of collateral securities. However, Claim 75 states that it optimizes data transfer through a transmission system. For the purposes of this examination, claim 75 will be understood as a computer program product to perform the method as claimed in claim 29.

8. Claim 76 is a computer program product for performing the method of claim 33, concerning optimizing data transfer through a transmission system. However, Claim 76 states that it optimizes the order of assignment of a number of tasks to a number of processors. For the purposes of this examination, claim 76 will be understood as a computer program product to perform the method as claimed in claim 43.

Drawings

9. The drawings are objected to because:

- *Numbering of views.* Drawing sheets 6/13 through 12/13 do not have Figure Numbers. Further Figures 10-16 seem to be missing(1) The different views must be numbered in consecutive Arabic numerals, starting with 1, independent of the

numbering of the sheets and, if possible, in the order in which they appear on the drawing sheet(s). View numbers must be preceded by the abbreviation "FIG." Where only a single view is used in an application to illustrate the claimed invention, it must not be numbered and the abbreviation "FIG." must not appear.

(2) Numbers and letters identifying the views must be simple and clear and must not be used in association with brackets, circles, or inverted commas. The view numbers must be larger than the numbers used for reference characters. 37 CFR 1.84(u). Proper correction required.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. **Claims 1, 8-15, 19, 20, and 22-56** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahuja et al., Network Flows, in view of Bertsekas at al., "Finding Maximal Benefit/Maximal Cardinality Assignments".

12. **As per claim 29:**

Ahuja teaches using network flow bipartite matching to solve various problems related to transmission lines. Specifically Ahuja teaches:

- building a network (see at least page 9 paragraph 3, and section 12.3 on page 469-470)
- in which the transmission lines are represented by transmission vertices (telephone exchanges and transmission facilities) connected to a sink vertex via sink edges of a flow capacity which represents the transmission rate (transmission of voice messages or of data) of the respective transmission line, the sink vertex being sink of a network flow (see at least page 9 paragraph 3);
- in which the senders are represented by sender vertices connected to a source vertex via source edges of a flow capacity which represents the data rate of the respective sender, the source vertex being source of a network flow (see at least page 9 paragraph 3); and
- in which transmission vertices and sender vertices are connected by edges of certain flow capacities (copper wire, see at least page 9 paragraph 3);

Ahuja does not specifically teach the applicant's manner of solving the network flow problem. However, Bertsekas teaches a reverse auction algorithm to solve the network flow bipartite matching problem. Specifically, Bertsekas teaches:

- determining an optimized network flow distribution of flow values through the edges by an iterative flow-method (see at least page 10 paragraph 2); and
- deriving the optimized order of assignment from the optimized network flow distribution by assigning the transmission vertices to the sender vertices in correspondence to the flow values of the connecting edges (see at least page 10 paragraph 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to solve the described network flow bipartite matching problem using a reverse auction algorithm with motivation to increase computing efficiency to solve the problem practically, see at least Bertsekas, page 3 paragraph 1, page 3 paragraph 2 and, page 9 paragraph 3.

13. **As per claims 30:**

Ahuja further teaches:

- wherein in the iterative flow-method comprises a discharge operation pushing a flow from an active vertex at which the sum of the incoming network flow is higher than the sum of the outgoing network flow along an admissible edge (see at least page 180 paragraph 3), where the admissibility of an edge is defined by a label of the vertex connected to the active vertex by the respective edge (see at least page 184 paragraph 2).

14. **As per claims 31:**

Ahuja further teaches:

- further comprising a relabeling operation changing the label of the active vertex if there is no admissible edge along which the discharge operation can be performed (see at least page 184 paragraph 2).

15. **As per claims 32:**

Ahuja further teaches:

- wherein, when the label of the vertex to be discharged is Y(v) and the label of a vertex connected by an edge is Y(w), said edge being admissible if Y(v) = Y(w) + 1, and wherein the label Y(v) of the vertex to be discharged is increased by one in the relabeling operation (the procedure augment, see at least Figure 6.17).

16. **As per claims 33:**

Ahuja further teaches:

- comprising discharge operations pushing flows from sender vertices to transmission vertices and discharge operations pushing flows from transmission vertices to sender vertices (see at least page 180 paragraph 3).

17. **As per claims 34:**

Ahuja further teaches:

- wherein the discharge operation is performed iteratively for sender vertices and transmission vertices (the while loop in the algorithm, see at least Figure 6.12).

18. **As per claims 35:**

Ahuja further teaches:

- determining an upper limit of the highest possible total flow through the edges (see at least page 185 paragraph 1); and

- iteratively distributing the network flow through the edges until at least one of the conditions is fulfilled (see at least page 184 paragraph 3):
- i) the network flow corresponds to the upper limit of the highest possible total flow (see at least page 185 paragraph 1),
- ii) the sum of the incoming network flow at a vertex equals the sum of the outgoing network flow of said vertex for each transmission vertex and for each sender vertex,
- iii) the number of iterations has reached a given maximum value.

Examiner Note: Only one of the conditions is particularly pointed out because of the applicant's use of the phrase "at least one of" in the claim language.

19. **As per claims 36:**

Bertsekas further teaches:

- wherein assigning the transmission vertices to the sender vertices is performed by an iterative assigning operation (see at least page 10 paragraph 2).

20. **As per claims 37:**

Bertsekas further teaches:

- wherein the assigning operation, in a first stage, assigns a transmission vertex to a sender vertex only if these vertices are connected by an edge for which the flow value equals the capacity (see at least page 10 paragraph 1, person *i* finds best object *j*).

21. **As per claims 38:**

Bertsekas further teaches:

- wherein the assigning operation first assigns transmission vertices to such sender vertices which are connected to the respective transmission vertex by an edge for which the flow value equals the flow value of the corresponding source edge before it assigns transmission vertices to such sender vertices which are connected to the respective supply vertex by an edge for which the flow value is equal to or higher than a remaining flow value of the corresponding sink edge which has not yet been assigned to a sender vertex (see at least page 10 paragraph 2).

22. **As per claims 39:**

Bertsekas further teaches:

- wherein the first stage is performed until all transmission vertices and sender vertices which are connected by edges for which the flow value equals the capacity are assigned (see at least page 10 paragraph 1).

23. **As per claims 40:**

Bertsekas further teaches:

- wherein the assigning operation, in a second stage, assigns a transmission vertex to a sender vertex if the flow value of the connecting edge corresponds to

the flow value of the corresponding source edge reduced by a fraction of its data rate already assigned to a transmission vertex, or to the flow value of the corresponding sink edge reduced by a fraction of its transmission rate already assigned to a sender vertex (see at least page 10 paragraph 2).

24. **As per claims 41:**

Bertsekas further teaches:

- wherein the assigning operation, in the second stage, first assigns such transmission vertices to sender vertices for which the flow value of the connecting edge corresponds to the flow value of the corresponding source edge reduced by a fraction of its data rate already assigned to a transmission vertex (see at least page 10 paragraph 2).

25. **As per claims 42:**

Bertsekas further teaches:

- wherein the certain flow capacity of an edge connecting a sender vertex to a transmission vertex is given by the smaller one of the capacity of the respective source edge and the capacity of the respective sink edge (page 3 paragraph 3).

26. **As per claims 1, 8-15, 19-20, 22-28, and 43-56:**

Ahuja in view of Bertsekas teach optimizing the data transfer through a transmission system. Bertsekas further teaches:

Optimizing the order assignment of a number of supplies (processors) to a number of demanders (tasks, see at least Application 12.9, "Scheduling on Parallel Machines" on pages 468-469).

Balancing a number of loan accounts with a number of collateral securities, where each loan account has a certain loan value and each collateral security has a certain security value (see at least last paragraph on page 568).

Optimizing the order of assignment of a number of tasks to a number of processors, where each processor has a certain processor capacity and each task has a certain capacity demand (see at least Application 12.9, "Scheduling on Parallel Machines" on pages 468-469).

27. **Claims 57-68 and 73-80** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahuja et al., Network Flows, in view of Bertsekas at al., "Finding Maximal Benefit/Maximal Cardinality Assignments" in further view of Kalagnanam, US Patent 6,044,361.

28. **As per claims 65:**

Ahuja teaches using network flow bipartite matching to solve various problems related to transmission lines. Specifically Ahuja teaches:

- a network comprising: a) a transmission vertex for each transmission line, b) a sender vertex for each sender, c) a sink vertex, d) a source vertex, e) edges, each having a certain flow capacity and connecting a transmission vertex and a

sender vertex, f) sink edges, each connecting the sink vertex to one of the transmission vertices and having a flow capacity representing the transmission rate of the respective transmission line, and g) source edges, each connecting the source vertex to one of the sender vertices and having a flow capacity representing the data rate of the respective sender (see at least page 9 paragraph 3);

Ahuja does not specifically teach the applicant's manner of solving the network flow problem. However, Bertsekas teaches a reverse auction algorithm to solve the network flow bipartite matching problem. Specifically, Bertsekas teaches:

- a network flow unit for determining an optimized network flow distribution through the network, the optimized network flow being represented by flow values through the edges (see at least page 10 paragraph 2); and
- an assignment unit for assigning the transmission lines to the senders by assigning the transmission vertices to the sender vertices in correspondence to the flow values of the connecting edges (see at least page 10 paragraph 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to solve the described network flow bipartite matching problem using a reverse auction algorithm with motivation to increase computing efficiency to solve the problem practically, see at least Bertsekas, page 3 paragraph 1, page 3 paragraph 2 and, page 9 paragraph 3.

Together, Ahuja in view of Bertsekas teach a method to solve the described network flow bipartite matching problem using a reverse auction algorithm. They do not

specifically teach that the method is performed on a computer. However, Kalagnanam teaches to solve a network flow bipartite matching problem on a computer. Specifically, Kalagnanam teaches:

- a supply input unit for inputting supply data representing supplies and their supply amounts (see at least column 8 line 33-43),
- a demander input unit for inputting demander data representing demanders and their demand amounts (see at least column 8 line 33-43),
- an access input unit for inputting access data representing, for each demander, the corresponding supplies, which can be accessed by the respective demander for satisfying its demand amount (see at least column 8 line 33-43);
- a network construction unit for constructing a network (see at least column 8 line 44-47),

It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of Ahuja in view of Bertsekas on a computer such as Kalagnanam's with motivation to improve computational speed and accuracy over a human's ability.

29. **As per claims 66:**

Kalagnanam further teaches:

- wherein the input units are formed by a single input unit (the centralized repository of all data, column 8 line 17-19).

30. **As per claims 67:**

Kalagnanam further teaches:

- wherein the input units are integrated into a single device (the server, column 8 line 17-19).

31. **As per claims 68:**

Kalagnanam further teaches:

- wherein the network construction unit, the network flow unit, and the assignment unit are realized by a single calculator unit (server 302, column 8 line 33-43).

32. **As per claims 75:**

Kalagnanam further teaches:

- Computer program product for optimizing the data transfer through a transmission system comprising a number of senders and a number of transmission lines comprising instructions which, when loaded into a computer, cause said computer to perform a method as claimed in claim 29 (server 302, column 8 line 33-43).

33. **As per claims 79:**

Kalagnanam further teaches:

- Storage medium comprising stored data which represent a computer program product as claimed in claim 75 (see at least column 8 line 44-54.

34. **As per claims 57-64, 73-74, 76-78, and 80:**

Ahuja in view of Bertsekas in further view of Kalagnanam teach optimizing the data transfer through a transmission system. Bertsekas further teaches:

Optimizing the order assignment of a number of supplies (processors) to a number of demanders (tasks, see at least Application 12.9, "Scheduling on Parallel Machines" on pages 468-469).

Balancing a number of loan accounts with a number of collateral securities, where each loan account has a certain loan value and each collateral security has a certain security value (see at least last paragraph on page 568).

Optimizing the order of assignment of a number of tasks to a number of processors, where each processor has a certain processor capacity and each task has a certain capacity demand (see at least Application 12.9, "Scheduling on Parallel Machines" on pages 468-469).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thuan Tran whose telephone number is 571-270-1832. The examiner can normally be reached on Monday-Friday 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Kramer can be reached on 571-272-6783. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thuan Tran
Patent Examiner
2-2-2009

/Stefanos Karmis/
Primary Examiner, Art Unit 3693